Reading Guide

for the Acids and Bases unit

Chemistry Chapter 9: Acid Basics

This chapter is all about acids and bases, two classes of compounds that are especially important in our watery world.

p. 166. Acids and bases are intimately connected! A substance is an acid if it contains an H^+ that it can lose, and a substance is a base if it can add an H^+. If they succeed, the thing that lost its H^+ is now a base, and the thing that gained the H^+ is now an acid.

p. 167. You don't need to memorize any of these acids or bases. This table simply gives examples of a variety of acids and bases. I will draw your attention to the statement at the last line of the table.

pp. 168–169. *Acids and Bases in Water*. This is why acids and bases are so important in our world: they affect the concentration of hydrogen ions, $[H^+]$, in water. The summarizing statement of these two pages is, conveniently enough, the last sentence.

pp.170–171. *pH*. Page 170 runs through most of what we have previously learned about equilibrium constants, by working through the chemical reaction for the "disproportionation" of water,

$$H_2O + H_2O \rightarrow H_3O^+ + OH^-$$

This is the "H" part of "pH." Page 171 explains the "p" part.

pp. 172–173. *Weak Ionization*. Acids don't always donate all of their protons to water, and bases don't always take a proton from water. These pages explain the equilibrium of weak acids.

p. 174. Don't worry about this numerical example. It just shows how the math works out.

pp. 175–176. The main point of these two pages is the equilibrium constant for the behavior of a weak base, on the bottom of page 175. Make sure you understand what the expression means, and what it tells about how a weak base acts. Don't worry about the numerical example at the bottom of page 176.

pp. 177–180. *Neutralization and Salts*. The only important part in this section is the box at the top of page 177. The rest is beyond the scope of this course.

p. 181. *Titration*. Read this, since you do some titrations in lab. The key part of this for us is that the pH changes abruptly when "equivalence" is reached.

pp. 182–184. *Solubility Products*. The key part of this section for us is page 182. Here the book dissects the equilibrium of the "reaction" (though it is "only" a "physical change") of a salt dissolving in water. The rest is beyond the scope of this course.

pp. 185–190. The concept of buffers is explained conceptually on pages 185–186. When you titrate sodium acetate and ammonium nitrate, the pH changes slowly over much of

the range because they act as buffers. This section of the text explains why. The rest of the section runs you through the math, which is beyond the scope of this course.

Wrap-Up

Although acid-base reactions area a very concrete reality, this chapter addressed some rather abstract concepts. Can you make a concept map encompassing the ideas of acids, bases, strong acids, weak acids, strong bases, weak bases, water, salt, ionization, disproportionation, and equilibrium?